# NEW SHARKS AND FISHES FROM WESTERN AUSTRALIA.

By GILBERT P. WHITLEY, F.R.Z.S.

## Family GALEIDAE.

### Genus GALEOLAMNA Owen, 1853.

### Subgenus GALEOLAMNOIDES Whitley, 1934.

### GALEOLAMNA (GALEOLAMNOIDES) EBLIS, *sp. nov.*

(Fig. 1.)

Diagnosis.—A Western Australian species of Whaler Shark with a narrow interdorsal ridge present, though becoming obsolescent anteriorly and posteriorly so that it does not completely unite the two dorsal fins; the dark colour of upper part of head does not descend below level of eye just behind the eye, though it does so before the eye; pectoral, anal and caudal fins with dark or dusky tips; snout acutely rounded; usually 14 teeth (see description below) each side of symphysial tooth; head and body together greater than tail from middle of vent (as 521 : 429 in holotype or 747 : 662 in allotype); anal origin and end typically behind levels of those of second dorsal fin.

*Description of Holotype Female.*

Head.—Predorsal profile not gibbous. Eyes large, with nictitating membrane. Interorbital convex. Pupil of eye on level with anterior curve of mouth. Snout acutely rounded. Head 3.9 in total length. Preoral length equals width of mouth. No spiracle. Teeth of upper jaw subtriangular, slightly and concavely notched on outer edges and with the rather gibbous inner slopes not notched. They are all (including the small symphysial teeth) coarsely serrated almost to their acute tips. The tooth on each side of the symphysial one is triangular but not notably smaller than its outer neighbours. Teeth of lower jaw somewhat compressed and slightly curved backwards, each with erect central fang separated on each side by a notch from its shoulder, the base is much longer than the height in most of the teeth, or slightly longer in those towards the tiny symphysial teeth. Serrations, microscopic.

Dental formula: $\frac{14.1.14}{14.1.14}$

Tongue rounded anteriorly, not notched below. Tongue and palate slightly rugose (but paratypes variable in these features). Last two gill-slits over pectoral fins. Nostrils about equidistant from mouth and tip of snout. Labial folds mere notches.

Body.—Rather robust. Lateral line conspicuous anteriorly. A narrow interdorsal ridge present but becoming obsolescent anteriorly and posteriorly (occupying 137 out of 230 mm. interdorsal space in the holotype). No keel on caudal peduncle. A caudal pit above and below. Shagreen very fine, close-set, denticles apparently tricarinate.

Measurements.—Following the symbols devised in my scheme of biometric measurements published in Proc. Linn. Soc. N.S. Wales lxviii, 1943, pp. 114-115, the dimensions of the new species are as follows, in millimetres:—

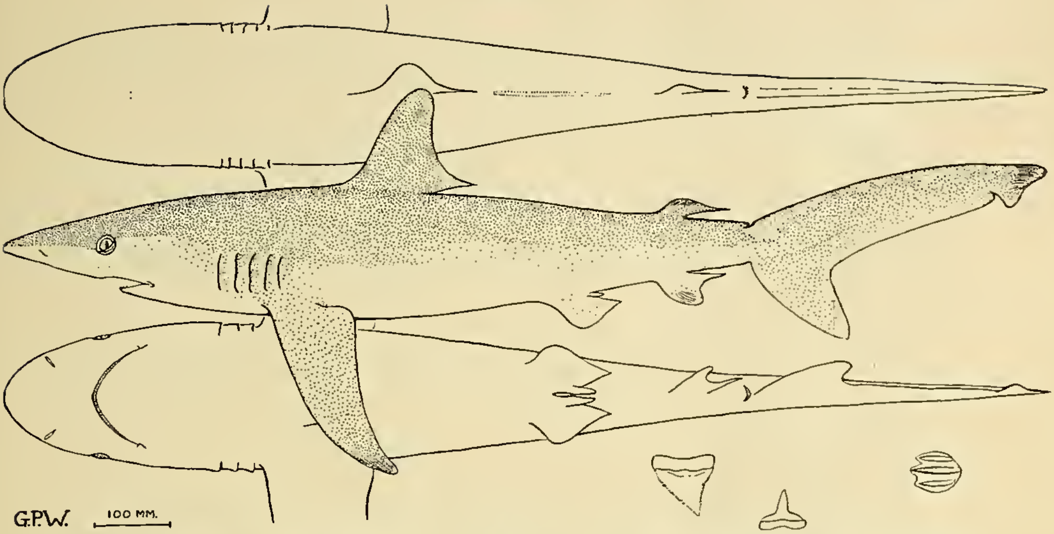

Fig. 1. Slender Whaler Shark, *Galeolamna* (*Galeolamnoides*) *eblis* Whitley. Dorsal, lateral, and ventral aspects; upper and lower jaw teeth, and a dermal denticle of the male allotype from Pelsart Island, Houtman's Abrolhos, Western Australia. —G. P. Whitley del.

| | *Holotype female.* | *Allotype male.* |
|---|---|---|
| H.1 | 195 | 289 |
| 2 | 240 | 369 |
| 3 | 91 | 130 |
| 4 | 104 | 148 |
| 5 | 236 | 346 |
| 6 | 494 | 704 |
| 7 | 20 | 27 |
| 8 | 18 | 21 |
| 9 | 102 | 157 |
| 10 | no spiracle | |
| 11 | 15 | 24 |
| 12 | 60.5 | 85 |
| 13 | 85 | 114 |
| 14 | 85 | 124 |
| 15 | 6 | 9 |
| 16 | 6.5 | 9 |
| 17 | 29 | 47 |
| 18 | 24 | 45.5 |
| B.1 | 696 | 988 |
| 2 | 521 | 747 |
| 3 | 321 | 467 |
| 4 | C.120 | 181 |
| 5 | 190? | 187 |
| 6 | 35 | 50 |
| 7 | 35 | 50 |
| 8 | — | 37 |
| 9 | — | 44 |

| | *Holotype female.* | *Allotype male.* |
|---|---|---|
| F.1 | 104 | 166 |
| 2 | 81 | 118 |
| 3 | 39 | 58 |
| 4 | 230 | 322 |
| 5 | 27 | 38 |
| 6 | 27 | 35 |
| 7 | 37 | 56 |
| 8 | 65 | 97 |
| 9 | 54 | 74 |
| 10 | 40 | 46 |
| 11 | 32 | 54 |
| 12 | 51 | 83 |
| 13 | (vide descr.) | |
| 14 | 158 | 283 |
| 15 | 50 | 80 |
| 16 | 277 | 397 |
| 17 | 46 | 67 |
| 18 | 45 | 59 |
| 19 | 28 | 44 |
| 20 | 115 | 179 |
| 21 | 253 | 388 |
| 22 | 105 | 167 |

Additional measurements are: Eye to first gill-opening, 95 mm. Tip of snout to outer angle of nostril, 54. Inner angle of nostril to mouth, 53. Ramal length, 62. Origin of first dorsal to that of pectoral, 137; to that of ventral, 208. Gill-slits: 29, 35, 35, 34, 24. Vent to end of tail, 429.

Fins.—Dorsal fins spineless, the first much larger than the second. Anal considerably larger than second dorsal. Anal origin and end of its base behind the levels of those of second dorsal fin. Pectoral axil well in advance of first dorsal fin but its last ray (pectoral angle) behind level of origin of first dorsal. Ventrals as usual in the family Galeidae. Subcaudal notch high and small. Caudal edges trenchant; anterior edges of other fins not flattened. Lower caudal lobe rounded.

Colour.—Brownish-grey above, white below. A dusky grey tinge towards tips of fins. The vertical pupil black, iris pale pearly green with grey ring. Junction between dorsal grey and ventral white ground colours occurs at lower level of eye anteriorly to eye and at upper level of eye posteriorly to eye.

Described from the holotype, an immature female, 950 mm. in total length; weight, 10 lb.

Liver, pinkish, 9 oz. No ova, and uteri mere strips, in the holotype. Museum Regd. No...............

*Locality.*—Off Bald Head, towards Breaksea Island, Western Australia; hooked on setline in about 20 fathoms, over rough ground, in morning, 30th September, 1943. Bait: Squid (*Sepioteuthis*) and Mullet (*Mugil*).

Other specimens referable to this new species are:—

(1) A pair of jaws in the Fisheries Office, Geraldton, with dental formula 14.1.14 — 29. Specimen caught off Geraldton by Mr. H.
13.13 — 26.
J. Murray.

(2) A specimen from Coventry Reef, off Garden Island, collected by W. B. Alexander in 1919. W.A. Mus., Regd. No. P.667. Female, 935 mm. total length. Head, 230; interdorsal, 230; upper caudal lobe, 240, approx.

### *Description of Allotype Male.*

A male specimen of this new shark was caught at Pelsart Island in the Houtmans Abrolhos, Western Australia, on November 5, 1943. It agrees in general features with the holotype but the following characters are noteworthy, as indicating variation.

Head (369 mm.) 3.7 in total length (1,375 mm.). Snout fairly acutely rounded. Preoral length (114 mm.) less than width of mouth (124). Tooth on each side of symphysial one in upper jaw noticeably smaller than its outer neighbours. Dental formula 14.1.14.

14.1.14.

Teeth in one functional series with here and there a second row tooth risen. Three non-functional rows of teeth in upper and four to five in lower jaw, all these normally covered by gums. Nostrils slightly nearer mouth than tip of snout. Snout to endolymphatic openings, 171 mm. Predorsal profile gently convex, not gibbous. Widest part of shark (199 mm.) is at first gill-slits. Interdorsal ridge occupying 154 mm. of the interdorsal space (322). Snout to vent (747 mm.) greater than length behind vent (622). Biometrics (see table).

| *Additional measurements* (in mm.) | *Holotype Female.* | *Allotype Male.* |
|---|---|---|
| Eye to first gill-opening . . .. | 95 | 151 |
| Tip of snout to outer angle of nostril .. .. .. .. .. .. | 54 | 77 |
| Inner angle of nostril to mouth .. .. .. .. .. .. .. | 53 | 60 |
| Ramal length .. .. .. .. .. .. | 62 | 100 |
| Origin of first dorsal to that of pectoral .. .. .. .. .. .. | 137 | 251 |
| Origin of first dorsal to that of ventral .. .. .. .. .. .. | 208 | 309 |
| Gill-slits I.-V. .. .. .. .. .. .. | 29, 35, 35, 34, 24 | 47, 49, 49, 47, 45.5 |
| Vent to end of tail .. .. .. | 429 | 662 |

Colour brownish-grey above in life, becoming greyer after death. White below. The dark colour of the upper parts descends to lower level of eye anteriorly but only to upper level of eye posteriorly to eye. Tips of pectorals, second dorsal, anal and caudal fins dusky grey. Iris, pale yellow and greyish-brown, with grey outer ring. Liver, olive-brownish, weight 2 lb. 0¾ oz. Oil, sun-extracted. Vertebrae, 174.

There are about four carinae on the dermal denticles, extending to form spines along the margins.

There was a slight lateral curvature of the spine to the left below the first dorsal fin. Vertebrae 1 to 31 before first dorsal origin, 69 below second dorsal origin, 70 over anal origin, 87 below upper caudal pit and 174 to end of tail. Testis, 103 mm. long, immature. Stomach, empty.

Described and figured from the allotype, an immature male, 1,375 mm. or 4 ft. 7 in. in total length, weight 35 lb. Brain, teeth and dermal denticles preserved. (Museum Regd. No...............)

Affinities.—*Galeolamna eblis* is apparently a common sea shark in Western Australia as I have seen numerous carcases of it in the Perth markets. Though sold indiscriminately as "Gummy," it may be distinguished from other butchered sharks in the markets by the interdorsal ridge being too short to unite the dorsal fins and by the second dorsal fin (even when cut off so that only a scar is left) being obviously very much smaller than the first.

*Galeolamna greyi* (Owen), seems more a river or estuarine species characterised by having larger, serrated triangular teeth in lower jaw, blunter snout, no interdorsal ridge, and deeper and rounder build than *G. eblis*, sp. n. The latter is most closely allied to *G. macrurus* (Ramsay & Ogilby) from New South Wales, but the incomplete interdorsal ridge is again diagnostic; it is always complete in *macrurus*.

### GALEOLAMNA FOWLERI, *sp. nov.*

(Figs. 2, 2a.)

Two Whaler Sharks were obtained by Mr. S. Fowler in the Exmouth Gulf area in October, 1943. It was not possible to preserve the specimens, but photographs and a pair of jaws indicate that the species is an undescribed *Galeolamna*. The teeth of the upper jaw are more angularly notched on both side and notably deflected outwards than in my (new) species from Albany and Pelsart Island and the dental formula is $\frac{13.1.13.}{12.1.1.1.12.}$

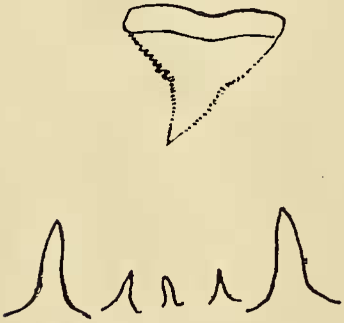

Fig. 2a. Teeth of holotype.
—G. P. Whitley del.

The upper jaw teeth are fairly coarsely serrated on base and finely serrated on cusp. Teeth of lower jaw erect, with tall fangs, not serrated, and without peg-like tops. The symphysial teeth are small and acute in each jaw. There is a minute tooth on each side of the very slender symphysial tooth of lower jaw; outside each minute tooth the lower jaw teeth are remarkably tall. Teeth in one functional series in upper, two in lower jaw, several rows behind these in gums. Mr. Fowler's photos show that this shark has a very long snout and small pectoral fins for the genus. However, the dentition alone is sufficiently distinctive, especially as regards the median teeth of lower jaw, to justify the proposal of a new name.

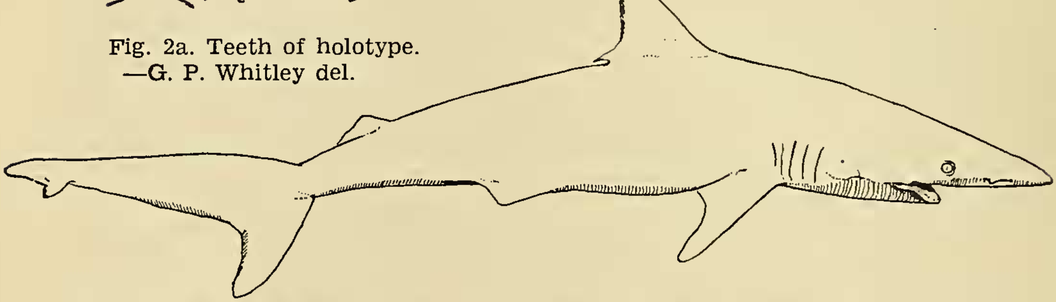

Fig. 2. Fowler's Whaler Shark, *Galeolamna fowleri* Whitley. Holotype from South Muiron Island, Exmouth Gulf, Western Australia.
—From photo. by S. Fowler.

Holotype jaws in W.A. Museum, Regd. No. P.2503.

*Locality.*—South Muiron Island, off Exmouth Gulf; male, about 5½ ft. overall, hooked, 20th October, 1943. Two others caught inside Exmouth Gulf, Western Australia.

Obtained by and named after Mr. Stanley Fowler, Senior Research Officer, C.S.I.R., Division of Fisheries, who has made many flights over North-west Australia on a pioneering aerial survey of the fisheries resources there.

### GALEOLAMNA DORSALIS, *sp. nov.*

(Fig. 3.)

Snout acutely rounded. Teeth small. Five gill-slits, the last two over pectoral fin. Body of elongate spindle-shape. Apparently no interdorsal ridge. First dorsal fin very large, its height greater than the depth of the body below it, its origin nearer pectorals than ventrals. Second dorsal and anal fins rather large. Caudal and ventrals as usual in genus; pectorals long.

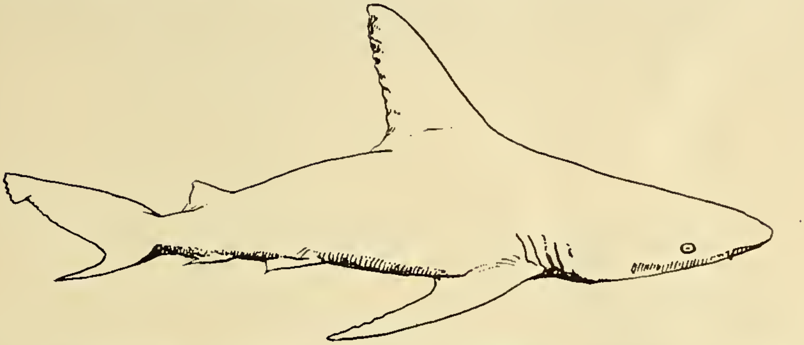

Fig. 3. Sand Shark, *Galeolamna dorsalis* Whitley. Holotype, Carnarvon, Western Australia.

Colour very light grey. No conspicuous dark marks on fins. Length up to about 5 ft.

Described from photographs of specimens caught off Carnarvon, W. Australia, in meshing nets by Marine Products of Australia, Ltd., in 1928, kindly made available by Mr. Alf. Melsom, who was a member of that firm. The species occurs along the N.W. Australian coastline, and was known as "Sand Shark" by the fishermen.

Distinguished from other species by the remarkably large and high first dorsal fin.

### Genus Longmania Whitley, 1939.

To this genus is referred a new species of Galeid sharks from Western Australia characterised by the small eyes; long, acute snout, with more than 15 teeth on either side of each jaw; oblique nostrils, without cirrhi; and lower caudal lobe conspicuously black-tipped. It differs from *L. brevipinna* (Muller and Henle, 1839) from the East Indies in having teeth minutely serrate in upper jaw, the lower caudal lobe black and labial folds long; the Queensland form of this species, illustrated in my "Fishes of Australia" (i., 1940, p. 107, fig. 107) also differs in similar respects; *Uranga nasuta* Whitley, 1943, from Queensland, has serrated teeth in upper jaw, but has plain lower caudal lobe. This genus has not hitherto been recognised from Western Australia.

### Longmania calamaria, *sp. nov.*

(Fig. 4.)

Head very acutely pointed. Predorsal profile sloping, not gibbous. Nostrils entirely inferior, much nearer mouth than end of snout, oblique, simple with a small inner point but no cirrhi. No spiracles. Interorbital convex, subequal to snout. Pupil vertical, lenticular. Nictitating membrane thick. Eyes small, their anterior margins on level with middle of upper lip, their diameter more than length of nostril. Preoral length subequal to width of mouth. Labial folds slit-like, rather long for this family. Ampullae of Lorenzini and pit organs conspicuous. Second to third gill-slits longest. Palate and tongue rugose, tongue with concave notch anteriorly. Rictus less than twice as broad as long. Teeth of upper jaw slightly compressed, with slender central fang with broad shouldered base, minutely serrate. No serrations are visible on lower jaw teeth, even under a lens. Small subtriangular symphysial tooth in upper jaw with a small tooth on left side of it. Dental formula $\frac{17.1.17 = 35}{16.1.16 = 33}$. Lower jaw teeth similar to upper but smaller, curved backwards, with more slender and more widely spaced fangs; a small erect symphysial tooth, with the tooth on either side of it smaller than their outer neighbours. Dermal denticles (from top of head), hard, shiny, imbricate, and with three to five keels, which barely cross to the more or less entire margin.

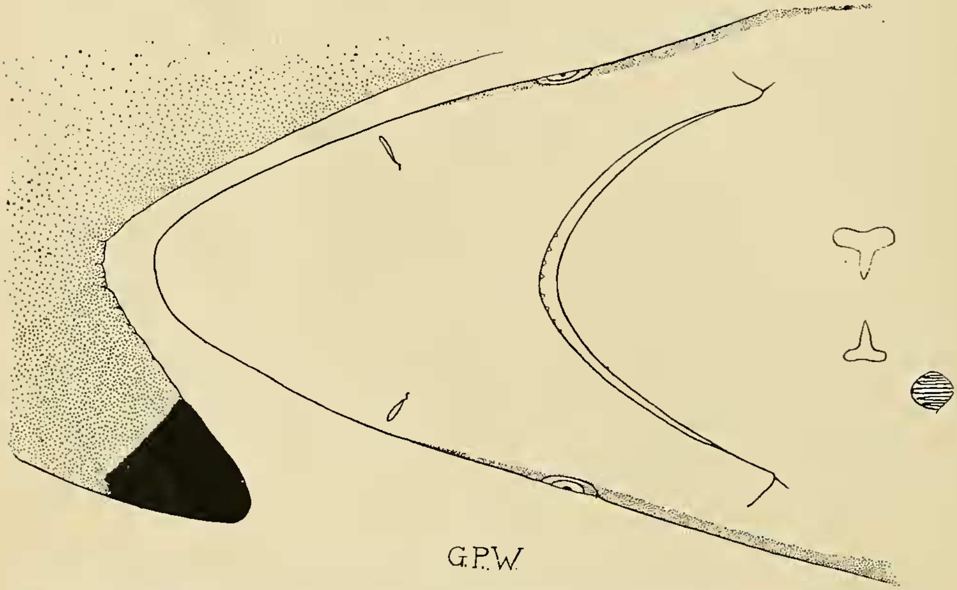

Fig. 4. Inkytail, *Longmania calamaria* Whitley. Holotype from Busselton, Western Australia. Left to right: caudal fork, ventral surface of head, upper and lower tooth, and dermal denticle.

—G. P. Whitley del.

*Dimensions in mm.*

| | | | |
|---|---|---|---|
| H. | 1. | Snout to first gill-slit | 366 |
| | 2. | Snout to fifth gill-slit | 460? |
| | 3. | Snout to anterior margin of eye | 163 |
| | 4. | Breadth of snout immediately before eyes | 152 |
| | 7. | Eye: horizontal diameter | 20 |
| | 8. | Eye: vertical diameter | 20 |
| | 9. | Interorbital | 151 |
| | 11. | Length of nostril | 16.5 |
| | 12. | Internarial | 83 |
| | 13. | Preoral length | 141 |

| | | | |
|---|---|---|---|
| | 14. | Width of mouth | 142 |
| | 15. | Upper labial fold | 15 |
| | 16. | Lower labial fold | 7 |
| | 17. | Height of first gill-opening | 174 |
| | —. | Eye to first gill-opening | 190 |
| | —. | Snout to nostril | 98 |
| | —. | Nostril to mouth | 63 |
| | —. | Snout to level of corners of mouth | 225 |
| | —. | Ramal length | 107 |
| B. | 6. | Depth of caudal peduncle | 78 |
| | 7. | Breadth of caudal peduncle | 65 |
| F. | 21. | Upper caudal lobe | 453 |
| | 22. | Lower caudal lobe | 215 |

The holotype specimen consists only of a head and tail in the Western Australian Museum, Perth, consequently no description of the body and other fins can be supplied. However, the parts available are so characteristic that no hesitation is necessary to name this novelty. It is hoped that a complete specimen may one day be preserved and described in detail.

The caudal fin is of the usual Galeid type with a notch well along the upper lobe, whose tip is pointed. The lower lobe is rounded and (215 mm.) goes 2.1 in the upper (453). A deep caudal pit above and below.

Colour grey above, white below, the junction of these tones running along the lowermost level of the eye and visible from the ventral aspect. Eye bronze-greyish with a grey ring and bluish pupil. Upper edge and tip of caudal fin blackish; lower quarter of lower caudal lobe black.

Described and figured from the unique holotype, estimated to have been about 5½ ft. in total length. W.A. Museum, Regd. No. P.2526.

*Locality.*—Off Busselton, Western Australia. Caught on setline, by Messrs. Nicholas, Soulos and Victor Veale, 15th November, 1943.

I am indebted to Fisheries Inspector L. Smith, of Bunbury, for his enterprise in forwarding this remarkable specimen to Perth and for his interest in shark-catches and shark oils which has been of valuable assistance to me in my survey of the shark resources of Western Australia.

## Family TRIAKIDAE.

### FUR VENTRALIS Whitley, 1943.

(Fig. 5.)

*Fur ventralis* Whitley, Rec. S. Austr. Mus., vii., 4, November 30, 1943, p. 397. Off Bunbury, W.A. Holotype in W.A. Mus., Perth.

Drawings of the holotype of this new species from Western Australia were prepared, but unfortunately too late for inclusion in the Records of the South Australian Museum, so they are reproduced here.

Many more examples have been caught and examined, showing little variation save in the dental formula. One female measured 1,240 mm. long, with head 232 mm.; interdorsal, 330 mm.; upper caudal lobe, 222 mm.; and dental formula $\frac{11.1.12}{36.}$

Four males gave: Length, 1,308-1,335 mm.; head, 245-253 mm.; inter-

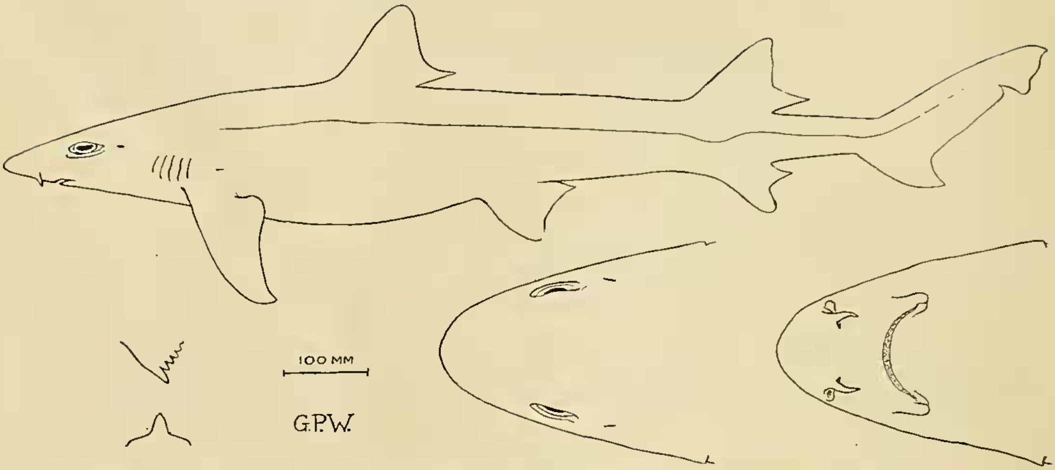

Fig. 5. Whiskery Shark, *Fur ventralis* Whitley. Holotype female from Bunbury, Western Australia. Lateral view, upper and lower teeth, upper and lower surfaces of head.

—G. P. Whitley del.

dorsal, 334-355 mm.; upper caudal lobe, 222-250 mm. Dental formula:

$$\frac{13.1.15}{37} = \frac{15.1.16}{42}.$$

### Family Plotosidae.

### Tandanus bostocki, *sp. nov.*

*Plotosus unicolor* Castelnau, Proc. Zool. Acclim. Soc. Vict., ii., May 10, 1873, p. 141. Preocc. by *P. unicolor* Cuvier & Valenciennes, Hist. Nat. Poiss., xv., 1840, p. 426; ed. 2, p. 316.

Castelnau's species requires a new name. It was described as having been "found by Mr. Bostock in the small water-holes of the interior of Western Australia," but the "interior," in Bostock's time was probably not many miles from the coast. I re-name the species after the Rev. Bostock.

The W.A. Museum has specimens of this species from Serpentine which show that it is referable to *Tandanus*, having the ventral fins far forward of the caudo-dorsal fin and lacking the dendritic appendage on the vent.

The barbels are slightly shorter than the "barbs" mentioned by Castelnau, and the eye is one-third of the snout in the largest specimen (holotype of the new species), 370 mm. in total length (W.A. Mus. Regd. No. P.241), but this is due to growth, small ones being as described by Castelnau.

D.i., 6. A. about 68 + C.5 caudal, and approximately 50 caudo-dorsal rays visible posteriorly before being covered by adipose tissue anteriorly. Thus D. + C. + A. = about 123 minimum. P.i., 14. V.C., 14.

Length of head, 65 mm.; its height, 40, and width, 51. Depth below first dorsal, 54. Eye, 9; snout, 28; interorbital, 24. Nasal barbels, about 24 (the left one bifid, abnormal). Maxillary barbel does not reach gill-opening.

Anterior nostrils opening forward over upper lip. Teeth peglike, white, in broader than long patches on intermaxillaries and mandibles and in a crescent on vomer. Gill-membranes meeting across isthmus. Gill-rakers short and slender, 14 on lower limb of first branchial arch, the posterior face of which has a crenulate margin and bears seven or eight soft processes.

Axillary pore minute. First dorsal behind head, its spine 33 mm. long, its longest (second) ray (44 mm.) less than depth of body. Pectoral spine, 32 mm., its longest (third) ray, 39. Dark greyish to brownish, rather marbled on fins.

From *Tandanus tandanus* (Mitchell), the West Australian species differs in being more elongate, with a great interspace between the first dorsal and the caudo-dorsal fin; West Australians records of *tandanus* are referable to this new form.

## Family OPHICHTHYIDAE.

### CALAMURAENA, *gen. nov.*

Orthotype, OPHICHTHYS CALAMUS Gunther, 1870.

Head short, broadly conical, body very elongate. Dorsal fin beginning above head, well in front of pectoral fin. Pectoral fin very small, rounded. Tail two-thirds of length, or twice the length of the body. Head small, one-fifth of distance between gill-opening and vent. Cleft of mouth one-fourth of length of head. Teeth small, in two series anteriorly, reduced to one series posteriorly. Vomerine teeth few, scattered.

The orthotype of the genus has been placed under *Cirrhomuraena* Kaup, 1856 (type, *C. chinensis* Kaup), from which it differs in proportions and teeth formulae. In that genus the dorsal fin begins above the gill-opening, the pectoral fin is long and narrow, the head long and elongate, the cleft of the mouth long, two-fifths the length of the head; the teeth small, of equal size, in double or triple series, forming broad bands.

### CALAMURAENA CALAMUS (Gunther).

(Fig. 6.)

*Ophichthys calamus* Gunther, Cat. Fish. Brit. Mus., viii., 1870, p. 74. Fremantle, W.A. Type in British Museum.

No illustration of this species having been published, I now figure an example in the Western Australian Museum, Perth, from Claremont, Swan River, July, 1939, Regd. No. P.1959; it is a little more than two feet long (618 mm.) and has the following characters.

Head (38 mm.) 4.7 in distance between gill-opening and vent (171). Cleft of mouth (8.5) 4.4 in head. Eye (3) 1.6 in snout (5) which is equal to height of gill-opening; gill-openings 7 mm. apart. Tip of snout to origin on dorsal, 21; length of pectoral, 10; tail, 409; depth of body, 15 mm. Posterior nostril in bulge in upper lip below anterior part of eye. Eyes adnate to head, lower jaw just reaching nostril. Anterior nostrils large. Lower lip with spaced ciliae. Throat grooved. Tongue not free. Pores around eyes and chin, others at preopercular angle and along lateral line. Integument plicate, mucous. Small depressible cardiform teeth in a broadarrow formation, in 1 to 3 series along upper jaw and vomer. Similar teeth on dentaries separated by a symphysial gap. A few teeth in advance of mouth under snout.

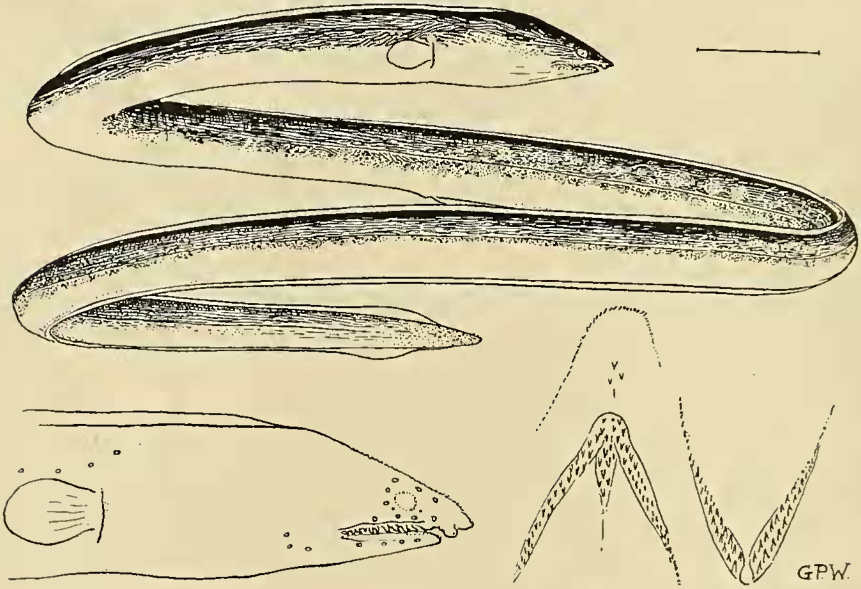

Fig. 6. Eel, *Calamuraena calamus* (Gunther). A specimen from Claremont, Swan River, Western Australia. Also head and dentition enlarged.

—G. P. Whitley del.

Dorsal and anal fins in grooves for the most part, elevated before the end of the tail, whose tip is rounded and provided with small thorn-like asperities. Brown above, pale yellowish below, whitish from chin to vent, the junction of the dark and light areas below lateral line. Fins cream. Anal and dorsal infuscated posteriorly; some brown dots each side of anal towards end of tail.

Others characters as given by Gunther.

### Family Echelidae.

### Genus Scolecenchelys Ogilby, 1897.

### Scolecenchelys tasmaniensis smithi, *subsp. nov.*

Body anguilliform, the depth (5.5 mm.) 4.1 in the head (23). Head nearly 12 in total length (275) and 4.3 in the space between gill-opening and vent (100). Eye (2) 2.2 in snout (4.5) and 11.5 in head, less than interorbital (2.5). Cleft of mouth extending somewhat behind eye, its length (5) 4.6 in head. Anterior nostrils tube-like with small flap at orifice; posterior nostrils below anterior portion of eye. Teeth in single rows on jaws and along vomer. Pores around eye, on snout, along jaws, at preopercular angle and along lateral line. Gill-openings slightly less than eye. Jugostegalia present. Vent in anterior half of fish, its distance from snout (123 mm.) 1.2 in the tail (152).

Dorsal and anal fins low. Predorsal length (135 mm.) less than distance from dorsal origin to end of tail (140). Origin of dorsal to level of vent (20) less than head. About eight caudal rays.

Colour pale brownish yellow in formalin, the upper portions speckled with brown dots.

Described from the holotype of the subspecies, an eel nearly 11 inches long, from Quindalup, Geographe Bay, Western Australia; W.A. Museum., Regd. No. P.704.

A larger specimen, paratype of the subspecies, from Rottnest Island (W.A. Museum, Regd. No. P.1016), has depth (8 mm.) 3.6 in the head (29) which is 12 in total length (c.350) and 4.3 in space between gill-opening and vent (125). Eye (2.1) 2.3 in snout (5) and 13.8 in head; less than interorbital (3.5). Cleft of mouth (6) 4.8 in head. Snout to vent (154) 1.2 in length of tail (c.196). Predorsal length (c.180) more than distance from origin of dorsal to end of tail (170). Origin of dorsal to level of vent (19) much less than head.

This indicates, as might be expected, some variation in the position of the origin of the dorsal fin as the fish grows. The snout is relatively shorter than in the Tasmanian type of *Muraenichthys tasmaniensis* McCulloch (Biol. Res. Endeav., i., 1911, p. 19, fig. 5), and the gape of the mouth more extensive. These differences, in conjunction with the uniserial teeth induce me to provide a new name for the Western Australian subspecies.

Named in honour of Mr. L. Smith, for some time Fisheries Inspector at Bunbury, Western Australia, who has assisted me in field work on sharks and fishes.

Distinguished from other Australian *Muraenichthys* and *Scolecenchelys* as follows. From *breviceps*, *devisi*, *ogilbyi* and *godeffroyi* by having the dorsal fin originating behind instead of well before level of vent. *S. australis* has dorsal origin only slightly behind vent, *tasmaniensis* has already been compared, whilst *iredalei* has depth 3.5 in head, eye equal to interorbital and more rudimentary fins.

### Family GALAXIIDAE.

### GALAXIAS TRUTTACEUS HESPERIUS, *subsp. nov.*

D.10; A.13; P.15; V.7; C.16.

Head (29 mm.) 4.3, depth of body (23.5) 5.2 in standard length (125) or 5.2 and 6.1 respectively in total length. Eye, 6 mm.; snout, 8; interorbital, 12; depth of caudal peduncle; 11; width of body, 18.5; depth of head, 18; postorbital, 15; predorsal length, 89.

Profile not excavated over nape. Lower jaw slightly the longer. Maxillary extending to below anterior third of eye. Interorbital flat. Tubular anterior nostril higher than wide; posterior nostril a simple orifice between eye and three large mucous pores. Upper surface of snout with villiform processes. Curved teeth on jaws, tongue and entopterygoids. Ten short slender gill-rakers on lower limb of first gill-arch.

Form elongate, 55 myomeres to just before caudal base; 58 pores along lateral lines.

Dorsal fin with three simple and seven branched rays, its base (13 mm.) shorter than that of anal (16.5). Dorsal and anal, when laid back, not extending to caudal base. Height of anal fin (16) more than that of dorsal

(12). Origin on anal slightly behind that of dorsal (using Scott's formula—see remarks below—the value is 13.3). Posterior ten anal rays branched. Ventral fin 14 mm. long, not reaching the large vent. Ventral origin notably nearer base of caudal than tip of snout. Origin of anal to that of ventral, 27 mm. Pectoral rounded, 15 mm. long, extending much less than half the distance from its base to base of ventral (38). Caudal emarginate, with moderate procurrent ridges.

Colour, in formalin, dusky olivaceous above, dirty yellowish below; snout, opercles and fins dusky olivaceous, but not black-tipped. A vertical dusky bar, with light yellowish boundary behind it, over pectoral base. Back and sides with numerous round dusky spots, not ocellated, smaller than eye, in more than thirty transverse series, and most distinct behind level of ventrals, corresponding to colour-phase C. of Scott's classification (Proc. Roy. Soc. Tas., 1940 (1941), p. 65). A short diffuse dark oblique mark below eye.

Described from the holotype of the subspecies, a specimen 5.3/5th inches in total length.

*Locality.*—Creek flowing into Taylor's Inlet (Nannarup), Albany district, Western Australia; caught on line by Mr. Jackson about 10th December, 1943, and forwarded by Inspector J. E. Munro, of the State Fisheries Department. Holotype, W.A. Mus., Regd. No. P.2580.

The Australian Museum, Sydney, has two smaller specimens from the Albany district (No. I.13280) with vertical bars behind pectorals, about 15 transverse rows of spots on body and no dark tips to fins. Length, 2¾ inches. These may be designated paratypes of the subspecies.

In Regan's key (Proc. Zool. Soc. London, 1905, ii. (1906), p. 365), the Nannarup specimen comes down to No. 17, *G. rostratus* Klunzinger, from the "Mersey River," *i.e.*, Murray River, South Australia, but this is an instance of how a dichotomous key can mislead, not only as regards identification, but, as keys often do, as to the relationship of species. The key-characters relied upon by Regan have been shown, by later research, to be variable. *Galaxias rostratus* is slenderer than *truttaceus* with very different proportions, coloration, situation of ventrals, etc.

The Albany district specimens agree well with *Esox truttaceus* Cuvier (Règne Anim., ed. 1, ii., "1817" = December, 1816, p. 184), the type of the genus *Galaxias*, which came from Tasmania, and has been studied in detail in recent years by E. O. G. Scott. *Galaxias truttaceus* has been recorded from Tasmania, the islands of Bass Strait, Victoria, South Australia, and New Zealand, so that the Nannarup record greatly extends its range. However, it seems advisable to provide a distinctive name for the W.A. form as it differs from the Tasmanian type in fin-counts and inasmuch as the pectoral and anal fins do not extend back so far.

Using Scott's formula for expressing the relationship between dorsal and anal fins in another allied species, *Galaxias scopus*, from Bass Strait (Proc. Roy. Soc. Tas., 1935 (1936), pp. 98-99), the Nannarup specimen gives

$$\frac{A-D}{(d-D) + (a-A)} \times 100 = 13.3.$$

Where A = length from snout to origin of anal; a = length to end of anal base; D = length to origin of dorsal and d = length to end of dorsal base.

The 13.3 of the W.A. specimen compares with the 0 to 2 for *Galaxias scopus,* and 14.3 for *G. truttaceus,* but these differences seem to me less significant than the lengthening of the trunk, different fin-counts, and less conspicuous colour markings of the W.A. specimen in comparison with *G. scopus.*

Scott has also detailed (Proc. Roy. Soc. Tas., 1940 (1941), p. 66, table iii.), the variation of body- and fin-ratios in the three colour-phases of *G. truttaceus.* My Nannarup specimen resembles most closely his Figs. 13 and 14, and colour-phases Ca and Cb, but is much longer than his fishes and lacks their nuchal concavity. Some significant differences between his largest specimen and mine are as follows:—

| | Scott's *maximum.* | Nannarup *type.* |
|---|---|---|
| Standard length .. .. .. .. .. .. | 109.1 mm. | 125 mm. |
| Head in standard length .. .. | 5.1 times | 4.3 times |
| Eye in head .. .. .. .. .. .. .. | 5.4 „ | 4.8 „ |
| Eye in interorbital .. .. .. .. | 2.5 „ | 2.0 „ |
| Length of pectoral fin in pectoral-ventral interspace . .. | 2.1 „ | 2.5 „ |
| Combined bases of dorsal and anal fins in standard length | 4.9 „ | 4.2 „ |

There is less discrepancy in other ratios.

It is noteworthy that many south-western Australian fishes are much larger than their eastern Australian allies, and this *Galaxias* is another case in point.

The existence in Western Australia of a second species of *Galaxias* (*G. occidentalis* Ogilby, having long been known from that State) is of considerable zoogeographical interest, but whilst *G. occidentalis* lives in fresh water along the lower western coast, *G. truttaceus hesperius* comes from the southern coastline.

The Australian Museum, Sydney, has specimens of *Galaxias occidentalis* from Boyup, Tambellup, and Northcliffe. The W.A. Museum, Perth, has 86 specimens, 30 to 166 mm. in total length, from the following localities:—

Kalamunda (P.32); Whitby Falls (P.2088); Serpentine (P.244); Warperup River, Laurier (P.698); Narrogin (P.414); Karridale (P.1162); Maddington (P.825); Group 79, Manjimup (P.924); Tambellup (P.1014, 1015, 1063); West Swan River—infected with *Clonorchis* (P.1114, 1115); Cunderdin (P.1432); Tunney, via Cranbrook (P.1801 to 1803); Brook below swimming Pool, Pemberton (P.1529 to 1577; 49 specimens); Harvey River (P.1782, 1783, 1804 to 1806); Dead Man's Creek, South Porongorups (P.1787); Fremantle, from tank fed by water from Mundaring Supply (P.2179); no precise locality (old Nos. 36, 89, 567 and 568).

The two W.A. species may be separated thus:—

A. Vertical bars along body. Caudal peduncle long and tapering. Origin of anal opposite that of dorsal. Ventral origin about half way between snout and base of tail. .. .. .. .. .. .. .. .. .. .. .. *G. occidentalis.*

AA. Body spotted. Caudal peduncle short and deep. Origin of anal behind level of that of dorsal. Ventral origin nearer base of tail than snout. .. .. .. .. .. .. .. .. .. .. .. .. .. .. *G. truttaceus hesperius.*

The land and freshwater faunas of the Albany-Esperance portion of Western Australia are apparently of great antiquity, and are autochthonous Australian animals. This area supports, for example, a frog, *Hyla cycloryhncha*, which is not found in the remainder of the south-west, and seems to have affinities with Tasmania.

### Family SYNGNATHIDAE.

### Genus LISSOCAMPUS Waite & Hale, 1921.

### LISSOCAMPUS AFFINIS, *sp. nov.*

D.11; A.O.; P.5; C.9. Annuli, 12 and 46. Subdorsal annuli = last 2 body-rings.

Snout (2 mm.) 3.2 in head (6.5); eye (1) 2 in snout and 6.5 in head. Head 2.4 in trunk (16) or 13.0 in total length (85). Trunk nearly 4 in tail (63) which is 1.3 in total. Dorsal base nearly 3 mm.; caudal slightly longer than snout.

General characters as described for *caudalis* by Waite & Hale (Rec. S. Austr. Mus., i., 1921, p. 306, fig. 46), but dorsal base is longer than snout, the pectoral fin is reduced to about half the size of theirs, and I cannot trace any anal fin; the caudal fin is twice as long as the pectoral. The brood pouch is subcaudal, below the first ten tail rings.

The low number of caudal annuli (46 in this specimen, compared with 60 in *caudalis*) is noteworthy.

Described from a male specimen 3-1/3rd inches long; holotype of the species.

*Locality.*—Bathurst Point, Rottnest Island, Western Australia. W.A. Mus., Regd. No. P.1150.

A paratype male (Austr. Mus., Regd. No. IB.341) was obtained by me in Shark's Bay in 1939.

### Family ATHERINIDAE.

### CRATEROCEPHALUS CUNEICEPS, *sp. nov.*

D.vi./8; A.i., 7; P.i., 12. Sc. 38. Tr. 9 or 10. Predorsal Sc. 10. Interdorsal Sc. 3 or 4.

Head (10 mm.) 3.6, depth (8.5) 4.2 in standard length (36). Eye, 3 mm.; interorbital, 3.6; snout, 2.8; depth of caudal peduncle, 3; length of pectoral, 7.

Form deep, compressed. Head flattened above, tapering down towards ventral profile; snout acutely pointed. Lower jaw the longer, mouth oblique, extensile, apparently toothless. Maxillary not reaching below eye. Rami of mandibles obliquely elevated. Premaxillary processes more than half eye-diameter. Head scaly, except before eyes. Ten short gill-rakers on lower limb of first gill-arch.

Body covered with large, entire, cycloid scales in 38 transverse rows between shoulder and hypural joint. Anus about three scales ahead of anal fin, situated between tips of adpressed ventrals.

No produced fin-spines. Origin of first dorsal slightly nearer snout than root of caudal. Anal base longer than that of dorsal, more than half its distance from caudal. Anal origin in advance of level of second dorsal origin. Third pectoral ray longest. Pectorals reaching above ventral base. Ventrals about opposite first dorsal origin. Caudal bilobed.

Colour in alcohol, straw-yellow, with a broad silver lateral band. Eye silvery. Fins whitish. Blackish chromatophores infuscate top of head, edges of dorsal scales, and extend along some fin-rays. A median dark streak from anal origin to just before lower caudal root along fifth scale-row. Dusky areas over brain and each eye.

Described from a specimen 45 mm. or 1-4/5th inches long, largest of a series of nine specimens, 20 to 36 mm. in standard length; W.A. Mus., Regd. Nos. P.1998 to 2005.

*Locality.*—Belele Station, via Meekatharra, Western Australia; presented by Mr. Alf Snell, Annean Station, Nannine, September, 1939.

Differs from *C. eyresii* (Steindachner), as described and figured by McCulloch and Waite, in having Sc. 38 instead of 31-33 and L.tr. 9 or 10 instead of 13-14, in being toothless, and in minor details of proportions. *C. pauciradiatus* (Gunther) has ventral and anal insertions further forward, fewer (less than 30) scales and teeth in jaws. From other species of Craterocephalus, the new form differs in fin and scale-counts and proportions.

## Family EPINEPHELIDAE.

### EPINEPHELUS HOMOSINENSIS, *sp. nov.*

Br.7. D.xi., 17; A.iii., 8; P.18. L.lat., 60 to hypural. L.tr., 0/1/44 between first dorsal and anal spines, to 12/1/12 on caudal peduncle.

Head (98 mm.) nearly 2.4, depth (80) 2.9 in standard length (235). Eye (20) 4.9, snout (18) 5.4 in head. Interorbital, 14; snout to end of maxilla, 45; length of pectoral, 60 mm.

No rugosities, bony ridges, or mucous cavities on head. Head large, mostly naked or with only vestigial scales apparent on vertex and opercles. Eyes large, interorbital very slightly convex. Preopercular margin serrated, with two or three larger serrae at angle, all pointing backwards. Upper opercular spine obsolete. Lower jaw projecting. Maxillary roundly truncate, naked, with small supplemental bone. Tongue smooth, rounded.

An outer row of cardiform and an inner band of villiform teeth in each jaw. Enlarged cardiform teeth on each side of upper symphysis. A canine on each side of each jaw anteriorly; large teeth depressible; lateral teeth not enlarged. A V-shaped patch of coarse villiform teeth on vomer and a band of similar teeth along each palatine.

Anterior nostril with skinny flap, but no tentacle; posterior nostril an open oval orifice. Gill-rakers slender, not very long, not being longer than gill-fringes, about eleven, plus some rudiments anteriorly, on lower half of first branchial arch. Upper border of opercular flap feebly curved.

Body moderately compressed, deepest at level of gill-flaps.

Scales with ciliated margins cover most of the body, including the cleithrum, but become vestigial or absent on anterior half of back on each side of spinous dorsal fin and are reduced in size on the breast. Small scales extend on to all fins except ventrals. Scale-rows of body are horizontal or slightly ascending posteriorly, crossing course of lateral line. Base of spinous dorsal subequal to that of soft. Membranes of spinous fins pencilled. First spine originating over opercular flap. Fifth spine longest (33 mm.) but shorter than the longest (twelfth) ray (35). Last dorsal spine 29 mm. Second and third anal spines strong, subequal and shorter than longest anal ray (31).

Pectorals broadly rounded, ninth ray longest. Ventrals behind pectoral base, second ray longest, pointed, reaching vent, but shorter than pectorals. Caudal broadly rounded.

Colour, in life, extremely variable, from brick-red to greenish, with or without large cream spots on head and crossbars on body, and changing continually. A dark brown "moustache" mark along preorbital posteriorly. No saddle-shaped blotch over tail. No black margin to dorsal fin. No white spots or dots over body.

In formalin specimens the general colour is greyish-brown of various tones with five oblique brown cross-bars below dorsal fins and across caudal peduncle. Fins of darker greyish tone. Eyes blue. A dusky blotch on breast anteriorly. No dark longitudinal lines.

Described from the holotype of the species a specimen 235 mm. in standard length or nearly 11½ inches overall.

*Locality.*—Geraldton, Western Australia.

W.A. Museum, Regd. No. P.2413 (holotype). Paratypes (P.2412 and 2430) measure 251 and 128 mm. in total length respectively. I have also seen numerous live and fresh specimens in the Geraldton-Abrolhos region, Western Australia, where the species is known as Chinaman Cod. It is excellent as food and need not be confused with the very different Chinaman Fish of Queensland (*Paradicichthys*).

The obsolescent superior opercular spine and the low number of body scale-rows (about 60 instead of the usual 100 or more) and the naked anterior half of the back alone separate this species from its congeners.

## Family SCOMBRIDAE.

### RASTRELLIGER SERVENTYI, *sp. nov.*

Br.6. D.viii. (+ ii. ?)/12 + 5 finlets. A.12 + 5; P.19. L.lat., c.120. L.tr., 10/1/30.

Head (66 mm.) 3.7, depth of body (68) 3.6 in length to end of middle caudal rays (245). Eye (15) 4.4, interorbital (20.5) 3.2 in head. Snout, 18.5 mm.; length of preorbital, 36; depth of preorbital, 10; snout to origin of pectoral, 68; to origin of first dorsal, 90; to origin of second dorsal, 149; to origin of ventral, 82; snout to vent, 146; depth at origin of first dorsal, 64; depth at vent, 58; length of pectoral along body, 36; depth of caudal peduncle, 8; interaxillary width, 35; base of pectoral, 11.5; maxillary, 37; mandible, 34 snout to preopercular margin, 63; height (chord) of first dorsal fin, 32; of second, 19; of anal, 20; upper caudal lobe, from fork, 43; lower caudal lobe, 39.

Eye with broad adipose lids, leaving middle third of eye exposed. Lower jaw the longer. Preorbital notch and maxilla below it reaching below hind margin of eye. Interorbital flat, bevelled over eyes. Teeth, if present, microscopic. Head naked except for some large scales on cheeks. Preopercular flap broadly rounded. Isthmus keel-like. Gill-rakers very long, extending into mouth, much longer than gill-fringes; 15/26 on first right branchial arch. They are flattened and feather-like, bearing numerous spines on their inner edges which form a fur-like strainer. Pseudobranchiae present.

Body tuna-like, somewhat compressed, covered with imbricate, oblong (broader than long) scales with crenulated margins and edges. These are smaller above than below the lateral line and largest just below pectoral bases. The scale-rows are mostly horizontal or as nearly so as the contours allow. Scales on breast minute. A naked sheath each side of first dorsal fin and a median naked strip towards nape. Lateral line very slightly curved. Two ridges on each side of caudal stem.

First dorsal originating behind level of ventral origin, its spines weak, curved, the third longest (26 mm.), any spines behind the eighth concealed in a groove. Distance from eighth dorsal spine to origin of second dorsal, (33); from there to base of last finlet, 74 mm. Pectoral short, acutely rounded, situated in upper half of fish. Ventrals shorter than pectorals, less than half head. Anal origin behind level of that of second dorsal. Five finlets above and below. Caudal strongly forked. The anterior fins fit into grooves for streamlining.

Colour, after long preservation in formalin, largely faded to straw-yellowish, the eye bluish. A round dusky spot, much smaller than eye, is covered by the pectoral fin. Three or four dusky longitudinal stripes on sides below lateral line. Three or four pairs of brown spots on either side of first dorsal fin and a brown spot at origin of second. Extreme tip of first dorsal dusky.

Described from a specimen about 270 mm. or 10½ inches in total length.

*Locality.*—Port Hedland, north-western Australia; coll. W. B. Alexander, 1914. W.A. Museum, Regd. No. P.18. New record for Western Australia.

Apparently closely allied to *R. canagurta* Cuvier (Règne Anim., ed. 2, ii., 1829, p. 197, as *Scomber*) from Vizagapatam, being similar to specimens described and figured as *Scomber microlepidotus* in Day's "Fishes of India," 1878, p. 250, pl. liv., figs. 3-5, but has fewer lateral line scales and pectoral rays, whilst the number of branchiostegal rays and gill-rakers are doubtless diagnostic also. Kishinouye's figures of *Rast(r)elliger chrysozonus* (Journ. Coll. Agric. Tokyo, viii., 3, 1923, p. 406, pl. xxxiv., fig. 63 and text-fig. W) show at least 140 scales in the lateral line and a comparatively smaller eye than in the Western Australian specimen.

*"Scomber" loo* and *moluccensis* differ, according to Gunther (Cat. Fish. Brit. Mus., ii., 1860, p. 360) in having fewer anal rays, with head and depth more than 4¼ in total length. In the north-western Australian specimen the head goes 4 and the depth 3.9 in total length. *Rastrelliger brachysoma* (Blecker) has head 3¾ and depth little more than 3 in same.

Specimens of *Rastrelliger* are not common in Museums. The Australian Museum, Sydney, has examples of this genus from Trengganu, Malaya; Ongtong Java, the Philippines, Andamans, Madras, as well as Cape Bedford, Queensland, and Port Hedland, Western Australia, but they are not available to me at present. Mr. G. L. Kesteven obtained two *Rastrelliger* from Yeppoon, Queensland, on July 1, 1939, which are preserved at the C.S.I.R. Division of Fisheries, Cronulla, N.S. Wales. One was 162, the other 165 mm. long, and X-ray photos of them, lent to me by Dr. Serventy, show that both have 31 vertebrae (14 + 17). In Kishinonye's figure (*op. cit.*, fig. W), there are 13 + 18, whilst Gunther (Cat. Fish. Brit. Mus., ii., 1860, p. 360) gives 14 + 16 for *"Scomber kanagurta."*

The Queensland Museum has three *Rastrelliger* from Cape Cleveland, near Townsville, Queensland; February 25, 1938 (about 6 in. overall), May 26, 1939 (10 in.) and March 21, 1940 (5 in.). The exact racial or specific differentiation of these specimens must await further comparison. Meantime, to afford a datum-line for future study, I name the north-west Australian form in honour of Dr. Dominic Louis Serventy, of the C.S.I.R., who has been engaged for some time in the study of Australian scombroid fishes.

## Family SILLAGINIDAE.

### SILLAGO FRASERI, *sp. nov.*

D.xi./20; A.ii., 18; L.lat., 66 to hypural joint + 3 to caudal root. L.tr., 6/1/11 below first dorsal, to 4/1/5 on caudal peduncle.
About 22 predorsal scales.

Head (27 mm.) 3.4, depth (16) 5.7, width (12) 7.7 in standard length (93). Eye (7) 3.8 in head. Snout, 10; interorbital, 5; length of pectoral, 17; depth of caudal peduncle, 8; the latter slightly less than postorbital portion of head, 10 mm. Length of caudal fork, 107; total length, 110 mm.

Upper profile of snout convex. Upper jaw the longer, not reaching back to level of nostrils. Interorbital not depressed, narrower than eye. Two to three rows of cheek-scales. Teeth villiform. Preopercle minutely crenulate. Scales of head cycloid, of body ctenoid with six radiae. A few vestigial scales behind dorsal rays.

General form of head and body and disposition of fins as usual in the family. No rays or spines produced, though the ventral fins are pointed. Dorsal fins separate. Base of second dorsal (31 mm.) much longer than that of anal (24). Ventral spine not expanded and originating before level of first dorsal's origin. Caudal emarginate, upper lobe the longer (17.5 mm.), subequal to pectoral.

Colour, yellowish above, white below. A narrow olivaceous axial streak. Top of snout, interorbital and opercles dusky grey; other parts of head and back infuscated. Some indistinct and diffused brownish-grey blotches, smaller than eye, along back, and a row of eight similar blotches, but more distinct, along sides from behind pectoral fin to middle of caudal peduncle. First dorsal fin with black dots along spines and on membranes adjacent to spines, but without a dark tip. Two or three rows of blotches of dark chromatophores slope downwards and backwards along membranes of second dorsal fin. Caudal infuscated, darkest on its base. No dark blotch on pectoral base. Pectorals, ventrals and anal mostly white, except for a tinge of yellow on ventrals. Eye bluish. Chin white.

Described from the holotype of the species, a specimen 93 mm. in standard length or 4.3 inches overall. W.A. Mus. Regd. No.............. A smaller paratype is 68 mm. in standard length.

*Locality.*—Leschenault Inlet, Bunbury, Western Australia; 7th December, 1943, collected by Dr. D. L. Serventy.

Distinguished from its congeners by its colour-pattern, fin and scale-counts.

Though superficially like the Trumpeter Whiting, *S. burrus* Richardson, 1842, it can be distinguished from that species by its larger scales (66 instead of 70), by lacking a conspicuous blackish blotch on pectoral base and having the blotches on the body in a horizontal instead of an oblique direction, and in having fewer anal rays.

Named in honour of Mr. A. J. Fraser, the enterprising Chief Inspector of Fisheries and Game, Perth.

## Family CALLIONYMIDAE.

### Genus CALLIURICHTHYS Jordan & Fowler, 1903.

### CALLIURICHTHYS GOODLADI, *sp. nov.*

Diagnosis: A new south-western Australian dragonet with straight preopercular spine (armed with spinules above and an antrorse barb below), interorbital concave, eight dorsal and seven anal rays, mostly simple, and eye about half length of snout.

Description: D.iv./8; A.7; P.18; V.i., 5; C.10.

Depth (15 mm) 8.7 in length to hypural joint (131). Head, to the posterior margin of the operculum (45) 2.9, and breadth before the pectorals (34) 3.8 in the same. Distance between the end of the snout and the tip of the preopercular spine (40) 3.2 in the standard length. Eye (9) 1.8 in snout (17) which is 2.6 in the head. Interorbital (3) 3 in eye; depth of caudal peduncle (8) less than eye.

Coarsely granular osseous rugosities on each side of cranium behind each eye. Gill-openings half-way between eye and ventral fin. Anterior margin of snout truncate (viewed from above). Upper lip projecting beyond the preorbital and overhanging the lower lip. Maxillary not reaching level of nostrils, which are small and situated before the small bony tubercle on the anterior orbital margin. Lower lip with a broad fold anteriorly. Preopercular spine curved slightly outwards but not upward at the tip. There are about a dozen small spinules on its inner edge and a strong antrorse barb on the outer surface of the base of the spine. Small teeth on jaws. Roof of mouth blackish.

Head and body depressed, sides rounded, caudal peduncle deeper than broad in the middle of its length. Lateral line of each side united across nape with branches extending forward to eyes and cheeks. Anal papilla small. Anterior dorsal spine slightly produced (32 mm. long) reaching near base of third dorsal ray, the three succeeding spines are progressively shorter, and are shorter than the anterior dorsal ray to which they are joined by membrane. Dorsal rays subequal in length and mostly simple, the last (eighth) is divided to its base and each branch is bifurcate; it reaches practically to above hypural joint. Anal of similar form to, but lower than, second dorsal, its origin and end behind levels of those of second dorsal. Upper margin of pectoral concavely excised, its median rays longest and most rays bifurcate. Ventrals broadly rounded, reaching vent, and with rays branched. Median caudal rays much longer than upper and lower ones, all but the outermost bifurcate.

Colour (in formalin), pale brownish-grey above, yellowish below. Eyes blue. Some small, sparse, grey flecks above head and body. About five diffuse grey blotches below the course of the lateral line. No ocelli, rings or pronounced bands or other markings. Top of head and snout, chin and viscera bluish. A brownish stain across branchiostegals below and a salmon-yellowish patch between pectorals on ventral surface. Fins pale yellowish. A black blotch mainly between tips of third and fourth dorsal spines. Some pale grey spots on second dorsal and others, more conspicuous, on upper portion of caudal fin. Anal and caudal margins smoky grey, without white borders.

Described from the holotype, a specimen 131 mm. in standard length or 7 inches overall. W. Aust. Mus. Regd. No., P.2528.

*Locality.*—Cheyne Beach, Albany district, Western Australia; seined by C. Westerberg, 20th July, 1943, and presented by Mr. James Goodlad, Fisheries Inspector at Albany, after whom I have much pleasure in naming the species.

Three paratypes, 117-126 mm. in total length, were taken from the stomach of a tunny (*Kishinoella tonggol*) in Shark's Bay, Western Australia, on August 7, 1943, by Dr. D. L. Serventy and myself.

The affinities of this fish are nearest *C. nasutus* McCulloch (Biol. Res. Endeavour, v., 4, 1926, p. 197, pl. lii.), from Queensland, but it differs in having fewer dorsal and anal rays, smaller first dorsal fin, truncate and broader snout, more prominent upper lip, interorbital 3 instead of 5 in eye, etc. From other species of the genus it differs in the key characters given by McCulloch or as described above.

## Family BLENNIIDAE.

### VAUCLUSELLA CALVA, *sp. nov.*

D.iii., xiii./11; A.21 or 22; P.16; V.2; C.12. L.lat., 19 tubes and 19 tubeless scales. L.tr., 9/1/8, or 7/1/9 at second dorsal, to 6 across caudal peduncle.

Head (9 mm.) 4.1, depth (6) 6.1, length of caudal (6) 6.1 in total length (37). Eye (3) 3 in head and much longer than snout (2).

Interorbital very narrow. Upper jaw the longer. Teeth small, in bands. A bifurcate tentacle at anterior nostril and a simple one over eye.

Gill-membranes united across isthmus. Head, throat, breast as far back as each side of anterior anal rays, and nape to each side of first dorsal fin, naked; there are some mucous pores crossing vertex of head. Body-scales ctenoid. Lateral line extending to below end of second dorsal, thence another 19 more or less notched scales extend to caudal. An anal papilla.

First dorsal spine (3 mm.) slightly longer than second; the second dorsal fin is longer and higher than the third. No produced rays or spines. Anal lower and longer than the second or third dorsals. Tenth pectoral ray longest, more than its distance from the snout, rays above it branched, but it and the lower rays are finger-like. Inner ventral ray the longer. Caudal rounded.

Colour, in alcohol, yellowish with spaced brown chromatophores on parts of opercles, lower half of pectorals, dorsals and anal, and scattered along back and flanks, snout and chin. Some large silvery flecks alternate with about ten dark blotches along sides below lateral line. Eyes bluish. Head mostly light in tone.

Described from the holotype, the smaller of two specimens, 37 to 39 mm. (up to 1½ inches) in total length. Holotype and paratype, W.A. Museum Regd. No., P.1052.

*Locality.*—Cottesloe, Western Australia; on reef near jetty; coll. Mr. L. Glauert, September, 1929.

Similar to *Tripterygion rufopileum* Waite (Rec. Austr. Mus., v., 1904, p. 182, pl. xxiv., fig. 4, from Lord Howe Island), but with more than 20 anal rays and more than 3 rows of scales above lateral line, eye much more than snout, and slenderer body.

## Family ANTENNARIIDAE.

### Genus ECHINOPHRYNE McCulloch & Waite, 1918.

### ECHINOPHRYNE GLAUERTI, *sp. nov.*

D.i/i/i/16; A.8; P.11; V.5; C.9.

Eye very small. Maxillary naked posteriorly, reaching below eye.

Mouth nearly vertical, with depressible cardiform teeth in several rows anteriorly and one or two rows at sides. Similar teeth on vomer and palatines, and some on sides of tongue. Nostrils superolateral, the anterior with skinny margin.

Depth (70 mm.) 1.8 in length to hypural joint (131); head, to end of operculum (43) 3 in same; eye (4) 3 in snout (12); first dorsal spine (17) 2.5 in head.

Gill-openings large pores before angle of pectoral fins. Pseudodrachium large and mobile. Body deep, compressed, the back grotesquely bulbous. Integument granular, like coarse velvet, not smooth, and lacking cutaneous appendages. Lateral line conspicuous anteriorly as a strongly arched chain of pores, curving down to lower half of caudal peduncle. Similar pores extend from before eye to shoulder, from mandible around preoperculum, with a branch towards pseudobrachium. First dorsal spine long, slender, and tapering, with a simple pennon-like illicium. Second and third spines enveloped in knobs of integument, which also nearly covers the rays of the long, low, soft dorsal. Second dorsal spine shorter than first and less than half length of third. Posterior dorsal and anal rays and most caudal rays branches. Margins of fins rounded. Anal fin originating below posterior half of soft dorsal fin. Dorsal and anal fins free from the short rounded caudal. Anterior pectoral rays longer than posterior. Ventrals small.

Colour.—General colour, soon after death (from a painting made by Mr. G. Pitt Morrison), light heliotrope grey (Ridgeway's Colour Standard) on head, body and fins. Some brown tinges on pectoral and ventral rays, across caudal near its base and tip, and in pectoral axil. A scarlet band across proximal parts of caudal rays and a splash of scarlet over anterior part of pectoral axil. Several large oval black ocelli, edged with white, on head and body: one each side of hump of third dorsal spine, three along base of soft dorsal, one on opercle, another over pectoral angle, one below middle of each side of body, three each side of belly, one each side of chin, others on pectoral base and a few dark flecks on the fins, which had apparently thin whitish margins. Tongue whitish with some dark marbling. First dorsal spine yellowish. No white patch on interorbital space or along back. No dark submarginal band on fins.

Described from the holotype, a specimen 131 mm. in standard length, or nearly 6½ inches overall. Western Australian Museum Regd. No., P.1459.

*Locality.*—Cottesloe Beach, Western Australia; washed up alive, 23rd July, 1935. Collected by the Misses B. and U. Glauert. A smaller paratype (No. P.1232) was found at Cottesloe in June, 1932, by Mr. L. Glauert. It is 60 mm. in standard length or nearly 3 inches overall.

Distinguished as follows from the only other species in the genus:—

A. Eye larger, 1.2 to 1.5 in snout. Mouth oblique. First dorsal spine thick and spiny. Dorsal and anal rays simple. Skin covered with upstanding prickles, bifurcate or trifurcate spines. Body without conspicuous dark ocelli. South Australia and Victoria. . *E. crassisipina.*

AA. Eye very small, 3 in snout. Mouth almost vertical. First dorsal spine slender and smooth. Some dorsal and anal rays branched. Skin a granular mat of blunter spicules. Body with conspicuous dark ocelli. Western Australia. . . . . . . . . . . . . . . . . . . . . *E. glauerti*, sp. nov.